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**(54) Device for sealing packages of rolled-up fabrics**

Vorrichtung zum Verschliessen von Verpackungen für Geweberollen

Dispositif pour le fermeture d'emballages de tissu embobiné

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(73) Proprietor:  
**LA MECCANICA COSTRUZIONE  
MACCHINE TESSILI S.P.A.  
I-24059 Ugnano (Bergamo) (IT)**

(72) Inventor: **Gastoldi, Paolino  
I-24059 Ugnano (Bergamo) (IT)**

(74) Representative:  
**Lunati, Vittoriano  
LUNATI & MAZZONI S.a.s.  
Via Carlo Pisacane, 36  
20129 Milano (IT)**

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**EP 0 656 295 B1**

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## Description

The invention relates to a device for sealing packages of rolled-up fabrics, in particular plastics packages.

It is known that packing sheets, generally made of plastic material, polyethylene for example, are currently wrapped around fabric rolls.

These packing sheets are clamped and locked to the rolled-up position in many cases with the aid of clips or staples of metal material.

Said clips are bent upon themselves in the same manner as common staples for holding paper sheets together.

The staples are applied to the end portions of the packing sheets which are disposed close to the ends of the rolls and folded in a layered or pleated form.

This known technique has the merit of being simple and cheap and also of holding said end portions of the packing sheets steadily, so that they practically form end bunches in the rolls, which bunches are also very useful for grasping the fabric rolls when they are arranged in a stack.

In fact, when several rolls are arranged in a stack, withdrawal of a single roll when it is not located uppermost is possible only by making the same slide in a direction parallel to its wrapping axis, and in this case the grasping point enabling said withdrawal is exactly said end bunch.

Beside the above advantages, this known technique also has some drawbacks.

In fact, due to the rules of law obliging to carry out a differentiated disposal of refuse, metal staples need to be separated from the packing sheets of plastic material before sending the latter to the dump.

Therefore a specific intervention on the staples is necessary in order to separate them from the plastics sheets. This operation is time-consuming and therefore increases costs.

The increase in costs may have an important incidence if we consider that, when a great number of rolls is to be handled, which usually happens in some industries in the textile field, it is sometimes necessary to assign appropriate staff to this operation of separating the different parts of the packaging before getting rid of them.

Another drawback is connected with the fact that the above metal staples do not enable achievement of a hermetic seal of the packages.

In fact the application of said staples involves the steps of bending them and turning their ends towards the central portion of same and therefore, once said staples have been bent, their profile is like that of a butterfly, that is the staple ends are expanded due to the presence of curved loops formed by said bending.

Practically the known metal staples in use produce on the layers they tighten a greater squashing at the central area than at the ends where said curved loops

are present.

Due to said unevenness in squashing, a perfect sealing cannot be ensured.

It is also to be noted that known metal staples not only are incapable of ensuring a perfectly sealed closure, but in some cases they may even become slack and slip off the package, thereby practically causing a complete opening of same.

Another drawback is connected with the variable thickness of the layered or pleated portions, to which said staples are applied. In fact it may be necessary to provide for the use of a wide variety of staples belonging to different size classes depending on the packages to be sealed by them.

In order to obviate some of the above drawbacks, it is possible to carry out closure of rolled-up-fabric packages by adopting sealing techniques for the sheets that do not use additional elements such as said staples.

For example the end portions of said packages may be heat sealed, but this process is restricted to fabric rolls which are not very heavy since in this case break ages in the packaging material are likely to occur.

Said packing sheets may also be sealed by ultrasonic welding, but this technique involves high costs for installation and in addition is of difficult adjustment.

The package ends may also be closed by adopting the technique of heat shrinkage by hot air. This known technique however is not widely applied because in some cases the material to be packed can be damaged.

In addition, heat-sealing, ultrasonic welding and heat-shrinkage reduce the sizes of said end bunches and therefore manual handling of rolls is made more difficult.

Devices for sealing packages have further been developed which are made of two elements to be mutually engaged in use. A device of this type, having the features of the preamble of claim 1, is disclosed in WO-A-8 707 240.

Said device has a relatively thick plate element for clamping the package end within the seat of the U-shaped element, and the toothed locking portions provided on the arms of the U-shaped element engage ribs or barbs shaped within the holes of the plate element.

Such a device has a limited adaptability to different sizes and thicknesses of packages, because in the case of too small sealing areas relative to the area of the seat of the U-shaped element the package material pressed by the opposed clamping surfaces can expand laterally toward the arms of the U-shaped element and this may jeopardize the sealing at the expanded portions. Furthermore, this device is relatively costly owing to the need of pre-shaping mating engagement means on the U-shaped element and in the plate element, and the engagement may become critical in the case of high clamping pressures.

Another sealing device in the form of a clamp is known from EP-A-0 002 844. Said device comprises a U-shaped element with teeth on the inside of its arms,

and an annular element adapted to receive the arms of the U-shaped element.

However, for performing a fixed connection between the two elements at least one wedge element is necessary for insertion between the arms to spread the same into engagement with the hole wall of the annular element. Therefore this known device requires a higher number of component parts and is more costly and more complex in use.

Under this situation, the technical task underlying the present invention is to devise a sealing device capable of substantially eliminating the above drawbacks.

The technical task specified is substantially achieved by a device for sealing rolled-up-fabric packages, in particular plastics packages, as claimed in Claim 1.

The features and advantages of the invention will be hereinafter described with reference to a preferred embodiment of same, with the aid of the accompanying drawings, in which:

Figure 1 is an exploded view of the component parts of the device of the invention, one of said parts being shown in face elevation and the other in top view and overturned;

Figure 2 is a top view, partly in section, of the component parts shown in Fig. 1, in an assembled condition;

Figure 3 is an elevational front view partly in section of the device of Fig. 1 in an operating position; and Figures 4 and 5 show two operating steps in succession for applying the device of Fig. 1 to a rolled-up-fabric package. Referring to the drawings, the device of the invention has been identified by reference numeral 1.

It applies to a package 2 consisting of a wrapping sheet of plastic material such as polyethylene for example, gathered at its ends so as to form end portions 3 folded in a pleated configuration.

The device 1 comprises a substantially rigid first clamping element consisting of a clip in the form of a staple 4, that is having a substantially U-shaped configuration comprising a central portion 5 and two side arms 6 parallel to each other.

Staple 4 is adapted to partly encircle a sealing area 3a disposed at an end portion 3 of said package 2.

Also provided is a second clamping element consisting of a plate 7 provided with a pair of gauged holes 7a to be coupled by force with the side arms 6 of staple 4 according to a plurality of positions, so as to define therewith a body fixedly and completely embracing the sealing area 3a.

Actually, said first and second clamping elements comprise means for mutual engagement by forced fitting adapted to define an irremovable clamping.

As discernible from the drawings, staple 4 is provided on its side arms with toothed locking portions 8

consisting of a series of extensions insertable in the gauged holes 7a, said gauged holes being such sized, relative to the locking portions 8, that the plate 7 once fitted can be removed therefrom only if it is broken or greatly torn. As visible in the drawings, the gauged holes 7a have a smooth circular configuration.

In detail, the locking portions 8 are formed on external regions of the side arms 6 turned outwardly from staple 4, so that the locking portions 8 of a side arm 6 do not face the locking portions of the other side arm 6.

In this manner, fitting movements of the plate 7 on the staple 4 are prevented when a localized pressure is exerted on the plate itself at a middle region thereof, that is the region between the two gauged holes 7a, as better clarified in the following.

In addition, the locking portions 8 turned outwardly of staple 4 enable the formation of a wide and smooth seat 4a, at the inside of said staple, into which the package 2 to be clamped can be introduced easily and without any risks of tearing.

Each of the locking portions 8 is saw-toothed and the teeth each exhibit an inclined face 8a with respect to the central portion 5, and a transverse face 8b substantially parallel to said central portion 5.

The inclined faces 8a promote a forced insertion of the plate 7, if conveniently pushed at the gauged holes 7a, whereas the transverse faces 8b fixedly hook the plate 7 externally of the gauged holes 7a, once it has been conveniently fitted, as best visible in Fig. 3.

The first and second clamping elements 4 and 7 define opposite clamping surfaces, 9a and 9b respectively, between which the sealing area 3a is squashed, within the seat 4a. The clamping surface 9a is defined by said central portion 5, as shown in the drawings.

The first and second clamping elements 4 and 7 are made of rigid or semirigid plastic material. Therefore the clamping surfaces 9a, 9b are pre-shaped on the elements themselves.

Advantageously, the selected plastic material is the same material as used for the manufacture of package 2: for example, if the packing sheets are made of polyethylene, the first and second clamping elements 4 and 7 will be of polyethylene as well.

Use of the device is as follows.

Staple element 4 is positioned on the sealing area 3a of a package 2 so that it embraces said area between the side arms 6 thereof, within the smooth seat 4a.

At this point plate 7 can be arranged so that its gauged holes 7a are disposed on the side arms 6 and pushed towards the central portion 5.

The thrust action must be exerted at the ends of plate 7 or at the gauged holes 7a so that a forced fitting of the plate itself may be allowed, due to the presence of the inclined faces 8a.

A thrust exerted on the middle portion of plate 7 practically does not enable a forced fitting, in that the inclined faces 8a are located externally of staple 4.

In this manner the package 2 is best clamped at the most critical areas and a better seal is achieved.

The plate 7 is moved close to the central portion 5 until it completely compacts the package pleats between the clamping surfaces 9a, 9b.

The toothed locking portions 8 stop the plate 7 to the final position reached and prevent slipping off of same.

The clamping surfaces 9a and 9b clamp the sealing area 3a by moving close to each other and therefore the staple 4 can be conceived of large sizes as regards the length of both the central portion 5 and side arms 6.

In this manner it can be fitted on a sealing area 3a of substantially any size.

It is pointed out that the adaptability of the device 1 to any type of rolled-up-fabric package is not to the detriment of the hermetic seal of same in that, even if the package 2 occupies only one portion of the room included between the side arms 6, the greater pressure necessarily exerted exactly at said side arms prevents the pleats from opening or moving to the free space.

The sealing area 3a is submitted to opposite pressures exerted by substantially parallel and opposite surfaces, corresponding to the clamping surfaces 9a, 9b.

Mutual approaching of the clamping surfaces performs a squashing action on the pleats of the sealing area 3a and causes a given orientation of said pleats which will tend to be arranged in tight contact with each other taking substantially parallel positions.

Pleats are only subjected to compression and any twisting stress is reduced.

In addition, according to one aspect of the invention shown in Fig. 3, the clamping efforts 10 are exerted close to the end edges of the sealing area 3a.

Thus a slight outwardly-convex bending of the clamping surfaces may be caused and at all events a squashing pressure which is higher exactly at the end regions of said pleats, where they form folding loops and where an appropriate seal is more likely to be lacking if the pleats occupy only part of the room included between the clamping surfaces.

Practically the greatest clamping action is exerted exactly at the most critical areas for the achievement of a hermetic seal.

The invention achieves important advantages.

The use of component parts made of the same plastic material as the packages reduces costs for disposal because packages and clampers are homogeneous and do not need to be mutually separated.

In addition, the device is adapted for packages which are very different from one another as regards size and thickness, because closure takes place between two opposite surfaces that can be conceived of large sizes and variably spaced apart from each other.

The sealing action does not cause twistings of the package, but a mere compression of same, thereby avoiding risks of tearings.

In addition compression is particularly marked

exactly at the edge pleats which are more critical for a hermetic sealing.

It is pointed out that the device is very simple and involves low costs.

## Claims

1. A sealing device for packages (2) of rolled-up fabrics, in particular for packages (2) of plastic material, comprising:

- a substantially rigid first clamping element made of plastic material and adapted to partly encircle a sealing area (3a) of a respective one of said packages (2),
- and a second clamping element of plastic material to be engaged with said first clamping element according to a plurality of positions, so as to completely enclose said sealing area (3a);

said first and second clamping elements defining pre-shaped and opposite clamping surfaces (9a, 9b) between which said sealing area (3a) is squashed, and having means for mutual engagement by forced fitting,

said first clamping element being a substantially U-shaped staple element (4) defining, at the inside thereof, a substantially smooth seat (4a), and having two side arms (6) provided with toothed locking portions (8) disposed externally of said seat (4a),

and said second clamping element being a plate (7) having a pair of gauged holes (7a) sized to receive said arms (6) with said toothed locking portions (8) and providing an irremovable connection when said plate (7) is engaged with said staple element (4), characterised in that the teeth of said toothed locking portions (8) have each a transverse face (8b) substantially parallel to the central portion of said U-shaped staple element (4),

and in that in the engaged position of said plate (7) with said staple element (4) said transverse faces (8b) fixedly hook said plate (7) externally of said gauged holes (7a), allowing an outwardly-convex bending of the clamping surface (9b) of said plate (7).

2. A device according to claim 1, wherein said gauged holes (7a) have a smooth circular configuration.

3. Use of a device according to claim 1 for sealing a package of a rolled-up fabric, wherein the package

(2) is made of a plastic material and wherein said U-shaped staple element (4) and said plate (7) are made of the same plastic material as that of said package (2).

### Patentansprüche

1. Verschlussvorrichtung für Verpackungen (2) von Geweberollen, insbesondere für Kunststoffverpackungen (2), umfassend:

- ein erstes im wesentlichen starres Verschlusselement aus Kunststoff, das einen zu verschliessenden Bereich (3a) der Verpackung (2) teilweise umschliesst,
- sowie ein zweites Verschlusselement aus Kunststoff, das mit dem ersten Verschlusselement in einer Vielzahl von Positionen derart verbunden werden kann, dass der zu verschliessende Bereich (3a) vollkommen umschlossen wird;

wobei das erste und das zweite Verschlusselement vorgeformte einander gegenüberliegende Fixierflächen (9a, 9b) bilden, zwischen denen der zu verschliessende Bereich (3a) zusammengedrückt wird, sowie Mittel zur gegenseitigen Verbindung durch zwangsweisen Eingriff aufweisen, das erste Verschlusselement ein im wesentlichen U-förmig ausgebildetes Klammerelement (4) ist, das in seinem Inneren eine im wesentlichen glatte Aufnahme (4a) bildet und zwei mit ausserhalb der Aufnahme (4a) angeordneten, gezahnten Klemmabschnitten (8) versehene Schenkel (6) aufweist, das zweite Verschlusselement eine Platte (7) mit zwei kalibrierten Löchern (7a) ist, die so bemessen sind, dass sie die Schenkel (6) mit den gezahnten Klemmabschnitten (8) aufnehmen und eine unlösbare Verbindung herstellen, wenn die Platte (7) mit dem Klammerelement (4) verbunden wird, dadurch gekennzeichnet, dass die Zähne der gezahnten Klemmabschnitte (8) jeweils eine zu dem mittleren Abschnitt des U-förmigen Klammerelementes (4) im wesentlichen parallele Querseite (8b) aufweisen, und dass bei Eingriff von Platte (7) und Klammerelement (4) die Querseiten (8b) die Platte (7) ausserhalb der kalibrierten Löcher (7a) sichern, was eine nach aussen gerichtete Wölbung der Verschlussfläche (9b) der Platte (7) zur Folge hat.

2. Vorrichtung nach Anspruch 1, bei der die kalibrierten Löcher (7a) eine glatte kreisförmige Ausbildung haben.

3. Gebrauch einer Vorrichtung nach Anspruch 1 zum Verschluss einer Geweberollenverpackung, wobei die Verpackung (2) aus Kunststoff hergestellt ist und das U-förmige Klammerelement (4) und die Platte (7) aus demselben Kunststoff hergestellt sind, aus dem die Verpackung (2) besteht.

### Revendications

1. Dispositif pour la fermeture d'emballages (2) de tissus embobinés, notamment d'emballages en matière plastique, comprenant:

- un premier élément de serrage essentiellement rigide fabriqué en matière plastique et adapté à entourer partiellement une zone de fermeture (3a) de l'un desdits emballages (2) respectifs,
- et un deuxième élément de serrage de matière plastique, à engager audit premier élément de serrage suivant une pluralité de positions, de manière à entourer complètement ladite zone de fermeture (3a);

lesdits premier et deuxième éléments de serrage définissant des surfaces de serrage opposées (9a, 9b) façonnées d'avance, entre lesquelles est pressée ladite zone de fermeture (3a), et ayant des moyens pour l'engagement réciproque par emboîtement à force, ledit premier élément de serrage étant un élément formant agrafe ou crampillon (4) sensiblement en forme de "U", définissant, à son intérieur, un logement sensiblement lisse (4a), et ayant deux bras latéraux (6) pourvus de portions de blocage dentées (8) disposées à l'extérieur dudit logement (4a), et ledit deuxième élément de serrage étant une plaque (7) ayant une paire de trous calibrés (7a) de dimensions adaptées à recevoir lesdits bras (6) avec lesdites portions de blocage dentées (8) et fournissant une liaison inamovible quand ladite plaque (7) est engagée audit élément formant agrafe (4), caractérisé en ce que les dents desdites portions de blocage dentées (8) ont chacune une face transversale (8b) sensiblement parallèle à la portion centrale dudit élément formant agrafe en forme de "U", et en ce que dans la position d'engagement entre ladite plaque (7) et ledit élément formant agrafe (4), lesdites faces

transversales (8b) accrochent de manière fixe ladite plaque (7) à l'extérieur desdits trous calibrés (7a), permettant un courbage convexe vers l'extérieur de ladite surface de serrage (9a) de ladite plaque (7). 5

2. Dispositif selon la revendication 1, dans lequel lesdits trous calibrés (7a) ont une configuration circulaire lisse. 10

3. Usage d'un dispositif selon la revendication 1 pour la fermeture hermétique d'un emballage de tissu embobiné, dans lequel l'emballage (2) est fabriqué en matière plastique et dans lequel ledit élément formant agrafe en forme de "U" (4) et ladite plaque (7) sont fabriqués de la même matière plastique que celle dudit emballage (2). 15

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